



Prospects of Ornamental Fish Culture and Trade in Ethiopia

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Abstract

Ornamental fish culture and trade is assuming exceptional significance in the context of improving the livelihood status of millions of rural people and the national economy in different parts of the world. To promote ornamental fish trade, attention is now being bestowed on mapping out the availability and the distribution of indigenous ornamental varieties of fish species in marine and inland water bodies. Greater attention has also been given to improve the culture techniques especially culture systems, aeration, lighting, filtration, water quality maintenance, feeding, breeding and disease management to boost ornamental fish production. Ethiopia is a developing country and that there is dire need to enhance the livelihood status of rural people and the economy of the nation. However, the country is taking serious steps in improving and developing viable technologies to promote livelihood status of rural people. Among others, ornamental fish culture can be considered as one of the vital sources to achieve the target. As per the estimate, the country has a rich fish biodiversity of more than 183 fish species, many of which can be considered as ornamental varieties based on their characteristic features mainly the size and shape, and colour patterns. Ethiopia, with a view to promoting aquaculture, has developed a National Aquaculture development strategy (NADS). Ornamental fish culture and fish trade will be one of the best options for improving the livelihood and the national economy. Ethiopia is one of the fast-growing economies in Africa in relation to trade and economy. The Ethiopian investment climate is considered as one of the best in East Africa and is growing in terms of foreign investments. The Ethiopian government has been encouraging investors from different parts of the world towards boosting agriculture and associated sectors. By analyzing the records from the Ethiopian Investment Agency, there are a very few investors who have invested on fish culture and trade, though the door is wide open for investors to work on Ornamental Fish Culture.

1. Introduction

Ethiopia located in the tropical zone with a wide range of altitudes < 200 msl (Danakil depression) and >4000msl (Ras Dashen) provides many climatic conditions from humid tropics to Alpine climates. The rainfall and temperature patterns vary widely between the countries even though it is located within the tropical belt. The temperature in Ethiopia is greatly influenced by changing altitudes. However, the atmospheric temperature is slightly higher in summer, March-April months. The annual range of variations in temperature is between 0 and 34.5°C in highland and low land, respectively. The highland receives large quantum of rainfall than the low land areas. The short rainfall occurs from February to April and the long rains from June to September. The total land area of the country is 11, 00000 sq.km. Agriculture is the main occupation and only less than 5% of land suitable for agriculture (3.5 m ha). Ethiopia has an extreme variability of soils (FAO, 1984). According to the Ministry of Agriculture about 19 soil types are identified throughout the country. The big proportion of landmass is covered by lithosols, nitosols, cambisols and regosols in the order of their importance (MoA, 2000). Contrary to most other African soils, the majority of Ethiopian highland soils remain relatively fertile at depth. Ethiopia has been described as one of the most severe soil erosion areas in the world (Blaikie, 1985). The estimated soil erosion rate is 1 b m³/yr, i.e., at the rate of 4mm of soil depth /annum (FAO 1981).

The forest cover at present is less than 3 % and the annual deforestation rate is 150,000 to 200,000 ha/yr. The climatic variation along with deforestation has accelerated land degradation in the unprotected watersheds. The rapid deterioration of land quality has reduced the food production of many regions of the country. The livestock population of Ethiopia is the largest in Africa, and the country has 35 million livestock units and 80 million livestock herds. The livelihood of a majority of the population depends on agriculture and livestock production.

Ethiopia is a land-locked country blessed with immense freshwater resources in the form of large lakes, rivers, reservoirs and manageable water bodies including springs and swamps.

The country has 12 major river basins (watersheds) of which the four watersheds namely: Andit Tid, Anjeni, Maybar and Yeku, support a booming population, most of which are small scale farmers and pastoralists. These watersheds face ongoing degradation and erosion, making the livelihoods of the rural community more vulnerable (Fig. 1).

The rift system forms a distinct rift valley through the centre of Ethiopia with an average of width of 80 km which separates the two great plateaus with high volcanic mountains with deep river valleys. The main drainage basins are flowing away from the rift systems either

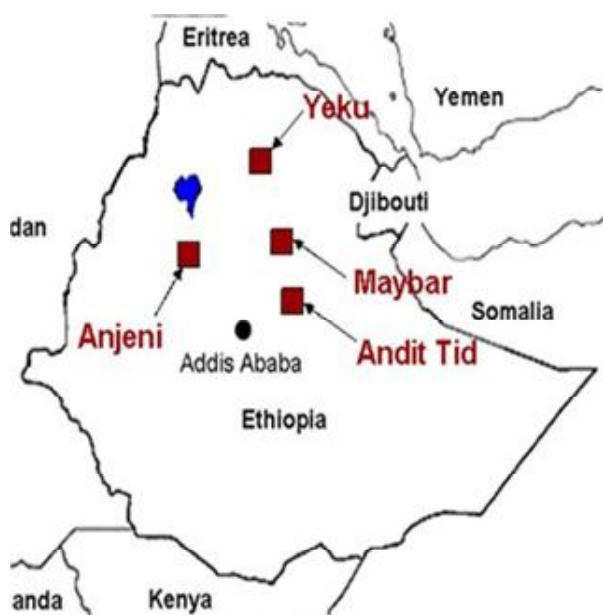


Fig. 1. Map of major watersheds in Ethiopia

towards Nile system in the west or to the Indian Ocean into the southeast (Table 1).

There are 11 large lakes such as, Tana, Awassa, Chamo, Shala, Langano, Ziway, Abijatha, Almaya, Haiyiq, Zengana, Zuqula (Table 2).

The lakes sprawl over many kilometers and situated at varied altitude and climatic conditions. In addition, there are man-made multipurpose reservoirs. There are several crater lakes situated along the rift system with hot springs, the area of most of them is less than 1 sq.km., and the depth varied from 5-266 m. There is great variability in the hydrological parameters of water in the lake system. Some of the crater lakes are saline lakes, inhabited by fishes which are endemic, while most others are stocked by fisheries department for stock enhancement. The objective of managing the multipurpose water resources is to increase agriculture and livestock production, including fishes. Efforts have been made in the past to stock fish in lakes, reservoirs and small water bodies. The success or failure of the stocking trials has not been reported. In addition to extensive fish cultured by stocking fish seeds in the reservoirs and lakes, there are greater possibilities for the development of fish culture in controlled condition. Despite these water resources, the development of the culture fishery is overlooked or insignificant even though capture fisheries flourish well especially in the rift valley lakes.

Fish exploitation in Ethiopia is mainly from the lakes. Ziway, Langano, Awassa, Chamo and Abaya are the most exploited lakes in the country. The capture fisheries is artisanal, with nearly 600 motorized boats are operating only in lake Tana. Lake Tana is one of the biodiversity hot spots of the country. There are more than 5000 fishermen and about 20,000 people involved in fishing and related activities. There about 68 fishery co-operatives operating in this country. Of the total 183 fish species available in the water bodies, commercially important species are few when compared to the other under-

Table 1. Major river basins in Ethiopia

Blue Nile	:	1,450 km
Shebelle	:	1000 km (in Ethiopia)
Awash	:	1200 km
Baro	:	306 km
Genale	:	858 km (480 km in Ethiopia)
Mereb	:	440 km
Omo	:	760 km
Tekese	:	608 km
Jamma	:	15,782 Km ² (drainage area)

Table 2. List of freshwater lakes in Ethiopia

Lakes	Area (Km ²)	Depth (meter)	Elevation (meter)	Fish catch (tons/yr)
Tana	3500	15	1840	1484
Shala	329	266	1558	Saline
Langano	230	46	1,585	No fishing
Zeway	7025	4	1846	2454
Awasa	551	11	1235	2454
Abaya	1163	13.1	128	—
Chamo	550	13		1350
Abijata	205	7.6	1,573	no fishing

exploited fishes. The commercially captured species include mainly the Nile tilapia (*Oreochromis niloticus*), African catfish (*Clarias gariepinus*), Nile perch (*Lates niloticus*), introduced common carp varieties and the barbs. The current annual per capita fish consumption is less than 240g. At present, the country has an annual total exploitable fish potential of only 51,481 tons which can meet only 79% of the current demand. The current annual demand for fish is estimated as 65, 344 tons. As the population is increasing, the demand for fish may significantly increase in future years. In view of this, it is necessary to explore all possible measures to enhance the livelihood status of rural farmers of Ethiopia. One of the avenues is to concentrate on the aquaculture of ornamental fishes.

Before the independence of Eritrea, Ethiopia exported marine ornamental fishes (coral reef fishes) mainly to USA, Singapore, Germany, and many other countries. The ornamental trade ceased since 1993 followed by the border conflict between the countries. However, there is a lot of scope for resuming freshwater ornamental fish trade in future. The culture of food fishes is done under extensive farming only to a limited level. No commercial farms are available. The culture of ornamental fish and the hobby of fish keeping is also at a low level. The ornamental koi carp is being bred and supplied by the Sebata fish hatchery center located near Addis Ababa. According to the data available, there are 36 species of indigenous freshwater fishes which are considered as aquarium fishes. The fishes belonging the family Cyprinidae are the dominant among the fishes because of the species richness. The ornamental fishes fall under 7 orders and 13 families (Table 3). The cyprinids and cyprinodont fishes exhibit vivid color patterns. Many species can be considered as inmates of community aquarium (Fig. 2). However, there is no data available on the stock, biology, and distribution of many of these species in the different aquatic systems. Aquarium keeping is not only a fascinating hobby it is an opportunity

Table 3. List of indigenous freshwater ornamental fishes in Ethiopia

Order	Family	Species	Status
Polypteriformes	Polypteridae	<i>Polypterus senegalus</i>	native
Characiformes	Alestidae	<i>Brycinus nurse</i>	native
Characiformes	Citharinidae	<i>Neolebias trewavasae</i>	native
Characiformes	Citharinidae	<i>Citharinus citharus citharus</i>	native
Cypriniformes	Cyprinidae	<i>Barbus humilis</i>	native
Cypriniformes	Cyprinidae	<i>Barbus kerstenii</i>	native
Cypriniformes	Cyprinidae	<i>Barbus pleurogramma</i>	endemic
Cypriniformes	Cyprinidae	<i>Barbus tanapelagijs</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra aethiopica</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra dembeensis</i>	native
Cypriniformes	Cyprinidae	<i>Garra blanfordii</i>	native
Cypriniformes	Cyprinidae	<i>Garra dembecha</i>	native
Cypriniformes	Cyprinidae	<i>Garra duobarbis</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra duobarbis</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra ethelwynnae</i>	native
Cypriniformes	Cyprinidae	<i>Garra geba</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra ignestii</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra makiensis</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra quadrimaculata</i>	native
Cypriniformes	Cyprinidae	<i>Garra regressus</i>	endemic
Cypriniformes	Cyprinidae	<i>Garra tana</i>	endemic
Cypriniformes	Cyprinidae	<i>Labeo coubie</i>	native
Cypriniformes	Cyprinidae	<i>Labeo cylindricus</i>	native
Siluriformes	Schilbeidae	<i>Schilbe mystus</i>	native
Siluriformes	Malapteruridae	<i>Malapterurus electricus</i>	native
Siluriformes	Mochokidae	<i>Synodontis batensoda</i>	native
Siluriformes	Mochokidae	<i>Synodontis eupterus</i>	native
Siluriformes	Mochokidae	<i>Synodontis nigrita</i>	native
Cyprinodontiformes	Nothobranchiidae	<i>Epiplatys bifasciatus</i>	native
Cyprinodontiformes	Aplocheilidae	<i>Nothobranchius microlepis</i>	native
Cyprinodontiformes	Aplocheilidae	<i>Nothobranchius patrizii</i>	native
Cyprinodontiformes	Aplocheilidae	<i>Nothobranchius virgatus</i>	native
Cyprinodontiformes	Cyprinodontidae	<i>Aphanius dispar</i>	native
Cyprinodontiformes	Cyprinodontidae	<i>Hemichromis fasciatus</i>	native
Perciformes	Cichlidae	<i>Oreochromis spilurus</i>	native
Tetraodontiformes	Tetraodontidae	<i>Tetraodon lineatus</i>	native

to conduct research, a source of income. At present aquaria are kept in few hotels and clinics in the cities. The hobby is not popularized in the rural areas.

Ornamental fishery resources exploitation is highly lucrative provided the activity is taken up in scientific lines with appropriate marketing strategies. Similarly, proper breeding, handling and transportation facilities are to be developed adopting environmental conservation strategies and government policies of the country. The live fish catching and marketing systems are yet to be initiated in Ethiopia. So, there is a need to develop live fish catching by following modern fishing and transporting to distant places. Moreover, there is lack of awareness about the ornamental fishes and their farming as a source of livelihood. The tribals and much rural population still follow the destructive method of fishing, especially poisoning the water with some plant leaves and seeds. This practice affects the fish population in the hill streams and low land water bodies.

Through extension activities and popularization of the economic benefits to the rural people, it is possible to conserve the fish resources and attract the mass towards collection and rearing of ornamental fishes. Most of the ornamental fishes in this country inhabit the streams and tributaries of river systems having varied micro-ecosystems and climatic conditions. In this context, it is relevant to take up studies on the identification of the habitats, stock potential, captive breeding and rearing of juveniles of potential species.

Studies carried out in different parts of the country by the research institutes indicate that the soil, water and temperature variations are highly suitable for developing ornamental fish culture. The country has an enormous supply of aquaculture inputs such as fertilizers, feedstuffs. While it is widely recognized all over the world that fisheries and aquaculture can improve income, nutrition and health of people, this sector is yet to make momentum in Ethiopia. In Ethiopia, a number of seminars and

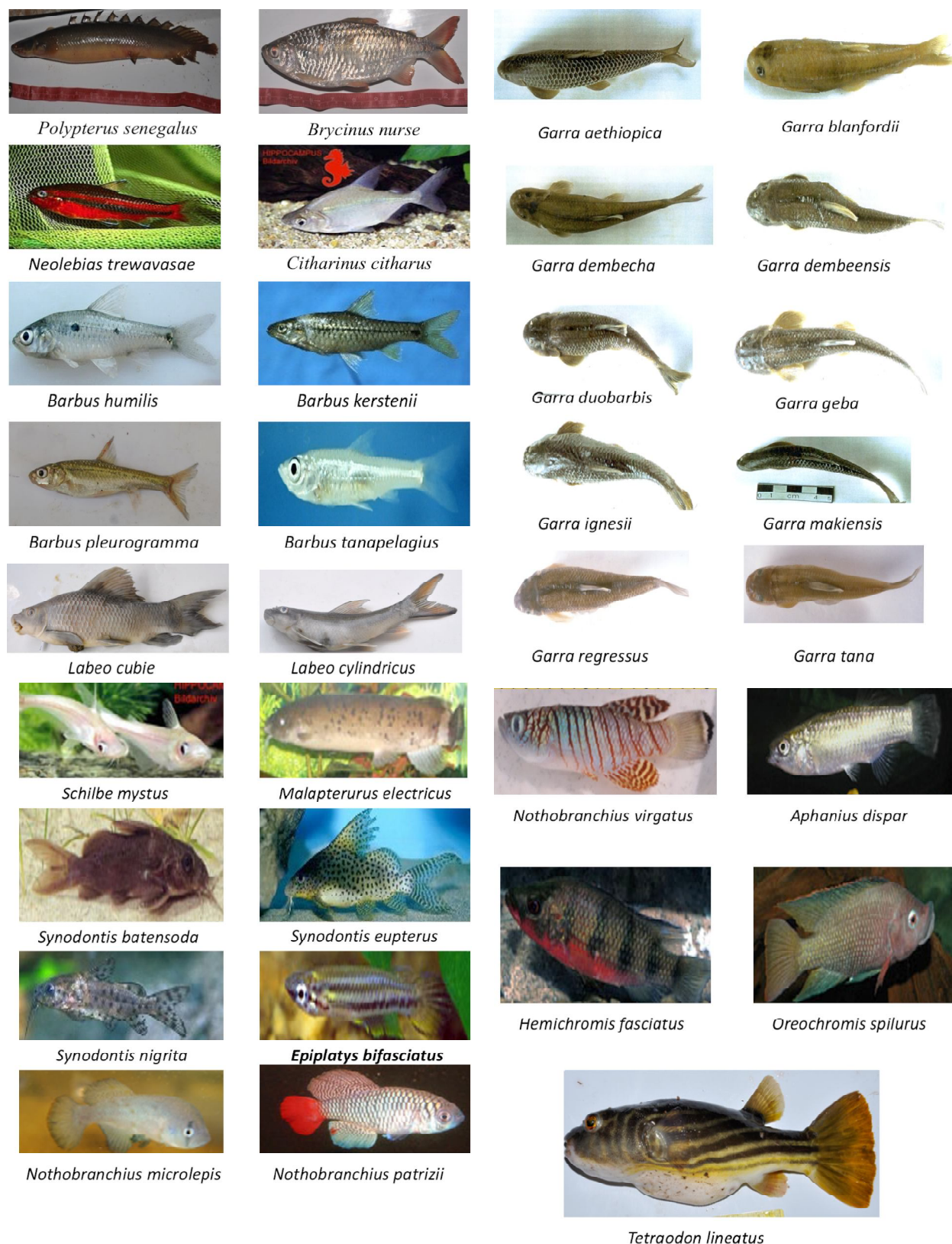


Fig. 2. Freshwater ornamental fish fauna of Ethiopia

conferences are organized by different institutions and research organizations to create awareness among people on the importance of aquaculture as a source of food, income and employment; to bring to light, the resource potential available in Ethiopia; to make aware the developments made in this sector in other countries, and the need to develop capacity building.

To give more thrust to fisheries education, the government has decided to start post-graduate degree programmes in aquaculture and fisheries. To promote aquaculture, the Ministry of Agriculture in collaboration with the FAO Sub-Regional Office for Eastern Africa has recently developed a National Aquaculture Development Strategy (NADS). This would be a strong hope for Ethiopia to make a

breakthrough in aquaculture. No doubt, ornamental fish culture and trade will be one of the best options for improving the livelihood and national economy through tourism and culture both in urban and rural sectors. The demand for ornamental fish trade in Ethiopia will have scope with the growing number of restaurants, hospitals, industrial establishments, educational institutions etc. The Ethiopian government's investment policy is one of the best in East Africa; the government is encouraging

investors from different parts of the world towards boosting agricultural and associated sectors. By analyzing the records from the Ethiopian investment agency, there are only a very few investors in fish culture and trade. However, the door is wide open to the investors to work on ornamental fish culture. It is with this sense that ornamental fish culture has great potential towards adding value to Ethiopian culture and tradition.

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